CHAPTER TEN
SPECIES MANAGEMENT

Just as Galveston Bay consists of a diversity of habitats, it is also home to a great diversity of species, some of which have considerable economic importance. Over 90 percent of the commercial seafood catch in the Gulf of Mexico is dependent upon an estuarine environment. Many marine species spend part of their life cycles in Galveston Bay; for many others the organic detritus produced in the Bay is an important component of their food chain. In addition, the wetland and open water habitats of Galveston Bay are utilized by 139 species of birds. Many more species, including the majority of the nations neo-tropical migratory songbirds, utilize the upland wooded watershed of Galveston Bay as breeding, feeding, wintering or migratory stop-over habitat.

Species-specific approaches to conservation are limiting, and the trend is toward the conservation of diversity rather individual species. Conserving diversity suggests an ecosystem approach and requires the preservation of various habitat types because the integrity of an ecosystem is dependent upon the integrity of the various habitats that compose that ecosystem. Policies and programs for habitat protection are described in the previous chapter. Recognizing that habitat protection is the most effective but not the most widely-used method of protecting flora and fauna, we address more specific programs to protect species of particular economic or public interest.

FISH AND SHELLFISH

Economic Value and Trends

Fish and shellfish represent one of Galveston Bay's most obvious economic assets. Between 1972 and 1989, 1.8 billion pounds of seafood products valued at $2.8 billion were reported landed in Texas. In 1989, in Galveston Bay, the catch was nearly 7.7 million pounds with a value of $6.5 million. Shrimp represented approximately 53 percent of that total by weight and 50 percent of the total ex-vessel value. All shellfish, including shrimp, crabs, oysters, and a few squid, accounted for 97 and 99 percent of the total, respectively. The remaining catch included a variety of finfish, including black drum, mullet, flounder, and sheepshead. (Trends in Texas Commercial Fishery Landings, 1972-1989, pp.96).

Landings of the three types of shrimp—white, brown, and pink—do not exhibit a consistent trend; rather some years have high yields and others lower yields. Eastern oysters, in contrast, exhibited high yields between 1982 and 1986 and a sharp decline thereafter. (Trends in Texas Commercial Fishery Landings, 1972-1989, pp. 66). A major cause of the oyster decline was the inundation of the Texas coast by the red tide, an influx of micro-organisms that produced large quantities of toxins. As a result, in November 1986, the Health Commissioner prohibited

oyster harvesting except in Galveston Bay. This ban continued in the bay system south of San Luis Pass because of sewage carried into the bay with heavy run-off following severe rain storms and flooding. Portions of Galveston Bay were also closed because of the flooding. The remainder of Galveston Bay became heavily overharvested as fishermen from other areas moved in. This led to the closure of Galveston Bay to oyster harvesting by TPWD between December 9, 1986 and February 19, 1987. Since that time TPWD has prohibited all oyster harvesting in Galveston Bay for the entire winter season. Oysters, which are also regulated by the Texas Department of Health because they may cause human health problems, are discussed in more detail in chapter 11.

Finfish are another important source of revenue for the Galveston Bay area, including both commercial and sport fishermen. From 1972 to 1981 red drum (*Sciaenops ocellatus*), spotted seatrout (*Cynoscion nebulosus*) and black drum (*Pogonias cromis*) accounted for approximately two-thirds of the finfish caught in Texas. Because of the decline in population, effective September 1, 1981, the legislature prohibited the sale of red drum and spotted seatrout. As a result, harvesting of black drum, and flounder (*Paralichthys sp.*) in the bay increased. However, elevated harvesting levels have not been maintained, with marked decreases in black drum since 1983 and of flounder since 1987. Total annual finfish landings declined from 8 million pounds in the years 1973-76 to 3-4 million pounds in the mid 1980s and 2.4 million pounds in 1989 (Trends in Texas Commercial Fishery Landings, 1972-1989, pp. 4, 57, 59). Similarly, in Galveston Bay, all finfish landings except for mullet were significantly lower in 1989 than at any time in the previous fifteen years. Two freezes in 1989 contributed to the decline in red drum and spotted sea trout populations. Some observers indicate an upswing in fish populations after 1989, perhaps due to the effects of H.B. 1000 which banned net fishing in coastal waters, made fishing less efficient, and reduced landings while allowing fish to replenish themselves. Favorable climatic conditions and TPWD's restocking program have also contributed to increasing fish populations. TPWD introduced nearly 5 million red drum fingerlings to the bay in 1991 and nearly 3 million by June of 1992.

Regulatory Framework

On a federal level, the U.S. Fish and Wildlife Service Wildlife and Fisheries Resource Program is responsible for improving and maintaining fish and wildlife resources through refuge management, law enforcement, and disease and population distribution studies. The Bay and Estuary Program within the Coastal Ecosystems Program of Fish and Wildlife Enhancement carries out USFWS' coastal legislative responsibilities and strives to combine all USFWS activities on a comprehensive watershed-wide basis. A large part of the Coastal Ecosystems Program is public outreach and education, and this is emphasized at the USFWS Clear Lake Field Office. Public information programs include news releases, leaflets and brochures, operation of visitor centers, self guided nature trails, observation towers and recreational activities.

Other federal programs include cooperative fish and wildlife research at universities, and coastal anadromous fish hatcheries production, stocking, and

research. The National Marine Fisheries Service (NMFS) conducts scientific research on biological and ecological components of the estuarine environment.

Under the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the Magnuson Fishery Conservation And Management Act (MFCMA), NMFS protects and manages marine mammals and turtles as well as fishery resources primarily harvested in the federal waters out to 200 miles offshore. Red drum, reef fish and coastal pelagic fisheries are managed in the Gulf of Mexico under the MFCMA. Under 50 CFR Parts 217, 222 and 227 shrimp trawlers in the Gulf of Mexico and other areas must use measures to reduce the incidental catch and mortality of sea turtles in shrimp trawls. In offshore waters, large shrimp boats must use turtle excluder devices (TEDs) and small boats must limit tow times or use TEDs. In inshore waters at specified times all shrimp trawlers are required to restrict tow times or use TEDs. Shrimpers who catch sea turtles in their nets must resuscitate and release them.

NMFS adopted a Habitat Conservation Policy in 1983 that is intended to ensure that marine fishery habitats, from the ocean to coastal wetlands and estuaries are fully considered in all NMFS programs and activities. The NMFS Southeast regional office also has LMR protection and enhancement guidelines that provide guidance to field biologists and contractors for use in reviewing permit applications and federal water-development projects. These guidelines include consideration of the following: fishery resources, no-net-loss of wetlands policy, cumulative impact, potential for avoiding impacts and whether or not a waterfront location is necessary and potential for mitigation.

With regard to pesticide control, the EPA is in the process of identifying and ranking which endangered species are likely to be affected by specific pesticides on a state and county level, and has developed a Biological Opinion (BO) which indicates if harm is likely to result from pesticide exposure. The BO also specifies pesticide use limitations to protect the species. In addition, the EPA is planning to modify pesticide labels to include a notice to the applicator that a bulletin is available in their county extension office listing the locations of endangered species and pesticide use restrictions for the county. Information regarding the relabeling of pesticides will be published in the Federal Register. In addition, SCS provides pesticide training to their technical extensions personnel on endangered species and habitats (mostly plants). Technical extension personnel in turn counsel landowners on their obligations to follow pesticide label rates and on the consequences of violations.

Within the state, the Texas Parks and Wildlife Department (TPWD) has primary responsibility for protecting fish and wildlife. Its programs include acquisition of land, management of fish and game resources, and protection of species listed under the Endangered Species Act.

As early as 1959, the legislature consolidated laws giving ownership of shrimp resources to the state and fostering the shrimp industry. The Uniform Wildlife Regulatory Act of 1967 gave the Parks and Wildlife Commission regulatory authority over 12 of the 18 coastal counties. In 1973 all coastal waters and all fish,

aquatic life and animals except shrimp and oysters were added with the exception of Harris, Galveston, Chambers and Victoria counties. In 1975 all of the laws and regulations governing the flora and fauna in the marine fisheries were organized into the Parks and Wildlife code under the jurisdiction of the TPWD. All marine life except shrimp in Galveston county was added in 1979. Finally, in 1985 TPWD acquired regulatory authority over all Texas shrimp and oyster resources.

The Texas Wildlife Conservation Act of 1983 requires TPWD to control the taking of aquatic resources. The Coastal Fisheries Division conducts scientific studies to demonstrate the need for regulation. Its monitoring programs give trends on relative abundance of finfish, crabs, shrimp and oysters in coastal waters. It prepares management plans that determine the optimum yield for economically important species, based on life cycle needs. Regulations based on the plan are adopted by the Commission following a public hearing. Emergency regulations may be imposed after natural disasters.

In addition to its regulatory program, Coastal Fisheries works to improve existing fishery populations by stocking Texas bays with red drum, spotted seatrout, and striped bass. Coastal Fisheries is revitalizing 500 acres of oyster reefs, educating fishermen and consumers on the utilization of seafood, and participating in the Gulf of Mexico Fishery Management Council. Under the Coastal Preserve Program, founded in 1987, TPWD leases state-owned submerged lands from GLO and operates them under an MOU.

State efforts to protect fish are supplemented by the federal Fish and Wildlife Act of 1956, which directs the Secretary of the Interior to develop, advance, manage, conserve and protect fish and wildlife resources; and by the Magnuson Fishery Conservation and Management Act of 1976. It unilaterally designated all ocean fisheries within 200 miles of the U.S. coast to be under the jurisdiction of U.S. fisheries management.

The Fishery Act also set up conservation zones, each with regional planning councils. The Gulf of Mexico Fishery Management Council is one of the eight regional Fishery Management Councils. It prepares fishery plans designed to manage fishery resources in the 200 mile limit in the Gulf of Mexico. These plans state the amount of fish that may be harvested and allow any surplus not taken by U.S. fishermen to be made available to foreign fishermen by permit. The plan is enforced by the U.S. Coast Guard and by NMFS enforcement agents. The Gulf Council meets bi-monthly and encourages public attendance. Voting members are nominated by state governors and appointed by the Secretary of Commerce for three years and include recreational fishermen, seafood processors, environmentalists, scientists, consumers, and representatives from state conservation agencies. Although Texas retains management control over a zone that extends 10 miles into the Gulf of Mexico, the law encourages contiguous management of all waters off the coast and, in 1983, the Gulf of Mexico Fisheries Management Council used its authority under the Act to close federal waters to shrimp fishing in accordance with the Texas Gulf shrimp season closure.

Although the commercial landings of most fish and shellfish appear to be cyclical, many observers believe there is a general decline in fish. In other states and in many other countries, fishermen have agreed to a limit on the total number of licenses and/or total catch. Such a system has the effect both of increasing the incomes of individual fishermen and of allowing for more effective planning and control for fish renewal. NMFS also advocates conversion from open access fisheries to controlled access through a property rights system of fisheries management such as individual transferable quotas and user fees. The agency argues that although controlled access does not prevent overfishing, it does make the fisheries more economically efficient, reducing the incentives to overfish. They note that there are few other industries that have free access to the nation's resources the way the fishing industry does. In Texas, it would probably take a constitutional amendment to allow state agencies to sell rights to fish, although in the past, shrimp harvests have been controlled by temporarily limiting the number of licenses sold.

Enforcement

TPWD imposes a wide range of controls on both commercial and sport fishing. All fishermen must have a license, which costs $13 for Texas residents or $25 for a combined hunting and fishing license. Other kinds of licenses are available. Methods, quantities, sizes, and season of catch are all regulated, with different rules for different kinds of fish. Special county restrictions are also in force for particular species and counties. For example, no one may place more than three crab traps in Harris County north and west of State Highway 146 where it crosses the Houston Ship Channel.

Under the Parks and Wildlife Code, regulations and enforcement mechanisms pertaining to hunting and fishing are essentially the same for aquatic life as they are for wildlife. There are 510 game wardens statewide, of whom 460 are field personnel. Approximately 50 are assigned to the three county area of Harris, Chambers, and Galveston, but only approximately 30 wardens work the three county area on any given day. These wardens are responsible for enforcing 2500 different regulations related to hunting, fishing, water safety, pollution, sand, shell and gravel, and water rescue. Enforcement of hunting and fishing regulations typically involves monitoring catch sizes and/or counts. Oysters, fish, and crab all have size limits. Shrimp has a count limit, as do certain game. Penalties are also assessed by count for anything that is harvested from closed waters. The same penalties apply to both commercial and recreational violators. Confiscation procedures differ slightly. TPWD wardens are required by law to confiscate and sell any illegal commercial catch. Illegal recreational catches are sometimes sold as well, but are more likely to be stored as case evidence, especially if the catch is already dead. Small catches that are still alive are returned to the water, unless needed as evidence. TPWD does not sell wildlife because it is illegal, but they do seize dead catches as evidence. Live young catches are released. Injured catches are rehabilitated and released.

Penalties for violating fish and wildlife laws are both criminal and administrative. Criminal violations are classified as either Class A, B, or C

misdemeanors with related fines. Administrative penalties include civil restitution, which requires anyone who takes resources illegally in Texas to pay the cost of replacing the resource. TPWD calculates replacement values according to criteria such as size, the number taken, and species endangerment. Replacement values often run quite high. TPWD has collected over $1 million in restitution penalties over a six year period and has another $2.5 million to $3 million in penalties outstanding. TPWD also has the administrative authority to revoke or suspend a license, but this program is apparently just getting under way. Increased fines for violators and widespread publicity have, in TPWD's view, significantly improved the effectiveness of fish and wildlife enforcement. The large majority of criminal hunting and fishing violations are Class C misdemeanors for which the maximum penalty was recently raised from $200 to $500. TPWD's authority to assess administrative penalties is the result of mid-1980s legislation and is thus also relatively new. One TPWD official estimates the number of statewide violations to have gone from approximately 40,000 to just over 30,000 and attributes this decrease to the new combination of criminal and administrative penalties assessable under the law.

Administrative penalties are most likely responsible for improved effectiveness because TPWD has no control over criminal proceedings. These cases are decided by elected local officials (justices of the peace, district and county judges) who are reluctant to impose fines on their local constituents. For example, the fine for a Class C misdemeanor is anywhere from $25 to $500, and even higher penalties can be assessed for habitual violators. Yet the criminal fines assessed rarely approach the maximum penalty. Judges may also opt to defer adjudication on a case. This is reported to be a common practice. A deferral period may last several months during which the defendant is on probation and is assessed a fee of approximately $50 for each month of the deferral. At the end of the deferral period, if the defendant has not violated his probation, the judge may find the defendant not guilty and therefore assess no penalty. The monthly fee is kept by the county and is not passed on to TPWD, which receives nothing if there is no penalty assessed. In addition, if the judge finds the defendant not guilty, TPWD may be forced to return to the defendant the value of the catch they sold.

BIRDS

As noted, the wetland and open water habitats of Galveston Bay are utilized by 139 species of birds, including shorebirds, seabirds, colonial nesting birds, and waterfowl. Many more species, including the majority of the nations neo-tropical migratory songbirds, utilize the upland wooded watershed of Galveston Bay as breeding, feeding, wintering or migratory stop-over habitat.

Unfortunately, birders have reported a steady decline in the number of birds over the last few decades. One of the major factors, as discussed in chapter 8, is loss of habitat. This is true for both migratory birds that require wooded uplands and shore birds that depend on isolated barrier islands and reefs. Areas that are primary sources of food, such as fresh water potholes, are also being destroyed, primarily as a result of salt water intrusion following dredging activities. Habitat for ducks has also disappeared with a subsequent decline in their population.

This has necessitated stricter hunting regulations, including bag limits for some species.

Neo-tropical migratory birds (such as warblers, buntings, orioles and hummingbirds) are also showing evidence of decline. The loss of Texas bottomland hardwoods, as well as upland habitat has decreased the areas suitable for nestings. Availability of fresh water is also critical for these birds as they complete their long migration. Concern for these birds prompted the formation of Partners in Flight, sponsored by the National Fish and Wildlife Foundation, which is developing funds for monitoring, research and education.

The federal Migratory Bird Treaty Act attempts to prevent the decline and extermination of bird species. Any activity that may violate the MBTA requires a Migratory Bird Special Purpose Permit from U.S. Fish and Wildlife Service. USFWS guidance for the regulatory application of this act focuses on the protection of migratory birds, active nests, eggs, and nesting colonies. We discussed USFWS review of dredge and fill permits in chapter 6.

TPWD is also actively involved in acquiring and managing habitat for waterfowl and issues hunting licenses. It also promulgates regulations for bag limits in order to control the decline in duck populations. As part of its efforts to enhance and restore habitat, TPWD provides nesting boxes as a means of temporarily increasing the amount of suitable habitat for reproduction.

ENDANGERED SPECIES

There are three endangered species known to breed in the vicinity of Galveston Bay: the Brown Pelican *(Pelecanus accidentalis)*, the Piping Plover *(Charadrius melodus)*, and the Bald Eagle *(Haliaeetus leucocephalus)*. Bald Eagles have been found to nest in the vicinity of the controversial Wallisville Reservoir. Two other endangered species (excluding sea turtles) utilize the bay at some time during their lives; these are the Interior Least Tern *(Sterna antillarum)* and the Peregrine Falcon *(Falco peregrinus)*. Many other species federally listed as candidate species have been reported in the wetland and open water habitats of the bay and in the surrounding upland watershed. Four species of endangered or threatened sea turtles are known to occur in the bay: Kemps' ridley (Lepidochelys kempi), green (Chelonia mydas), loggerhead (Caretta caretta), and leatherback (Dermochelys coreiacea). NMFS has recorded sightings, strandings or capture of each of these species, primarily near passes but also well within Lower and Upper Galveston Bay and West Bay.

The federal Endangered Species Act is the primary means for protecting endangered species. Any activity (public or private) that may affect an endangered or threatened species is required to be reviewed by USFWS (and NMFS for marine mammals, sea turtles and marine fishes) to determine what impacts if any the proposed project will have on listed species.

One of the provisions of the act is to set aside habitat that is critical for the survival of a threatened or endangered species. However, no critical habitat has been

proposed for the Galveston Bay area. Breeding habitat for animals listed as endangered or threatened can also be protected under the act even if it has not been designated as critical.

The Endangered Species Act is to be reauthorized in 1992. The reauthorizing legislation for the law, the Endangered Species Act Amendments (H.R. 4045) strengthens programs for the conservation of threatened and endangered species by providing additional protections for candidate species in hopes that subsequent listing will be prevented. It also places a higher priority on the development of recovery plans for listed species, and increases funding for implementation of the act. However, the entire act is under considerable pressure from those, including loggers in forests protected by the listing of the Northern spotted owl, who believe that it puts "animals before humans." Without its protections, many species (of plants and insects as well as more attractive creatures such as turtles) will disappear and their ecosystems permanently disrupted. There are four species of endangered or threatened sea turtles known in the bay.

The National Marine Fisheries Service reviews projects affecting habitat of endangered and threatened marine and anadromous fish, marine mammal and sea turtle species; for the southeast region, including Texas. Review is conducted in the regional office located in St. Petersburg, Florida. USFWS also administers the Endangered Species Act by developing endangered species lists, conducting state surveys, preparing recovery plans, research, operation of wildlife refuges, law enforcement and coordination of national and international efforts. Several programs and divisions within the Department of Fish and Wildlife Enhancement provide regulatory review of land and water alteration activities that may adversely affect fish and wildlife. Permits from USFWS are required by the Migratory Bird Treaty Act and the Endangered Species Act; all other regulatory programs require only USFWS comments. Although only federal agencies are required to consult under the ESA, private individuals may be required to have a consultation to obtain federal permits or licenses. Consultation also may be required from NMFS if species under NMFS purview are involved.

NMFS also has responsibilities under the Marine Mammal Protection Act (MMPA) and related permit requirements. Dolphins, for example, are protected under this Act and permits are required for capturing or otherwise harassing them. Endangered and threatened species and marine mammals protected under the MMPA may also be affected by activities such as maintenance dredging of channels in and leading into Galveston Bay.

Section 6 of the Endangered Species Act requires USFWS to cooperate with the states and provides for cooperative agreements with any state "which establishes and maintains an adequate and active program for the conservation of endangered species and threatened species." TPWD entered into a cooperative agreement with USFWS in December 1987 and received its first appropriation of money in 1988.

Endangered species regulation was first passed in Texas in 1973 and amended in 1981, 1985 and 1987. TPWD's Resource Protection Division maintains an inventory of all threatened and endangered species for potential listing under the Endangered Species Act. It issues permits, as required, for the propagation and use of threatened and endangered plants taken from state-owned lands. A new state law that prohibits the placing of fish or plants in state waters is designed to stop introduction of exotic species.

Expansion of the endangered species program has been facilitated by the availability of federal funds under Section 6 of the Endangered Species Act. TPWD submits a list of priority projects to USFWS each year, and USFWS covers up to 75 percent of the cost of those projects that it selects. For 1989 and 1990 Texas received over $300,000 for 36 projects. Another program supported with federal funds is the Special Nongame and Endangered Species Conservation Fund. Established by the Texas Legislature in 1983, it is designed to support nongame and endangered species research and management. The sale of prints, permits and decals, as well as private donations, has established a fund of $550,000. Nongame and endangered species activities, including land acquisition, are reimbursed from federal Pittman-Roberson or Section 6 monies. So far three nongame wildlife management areas have been established through this program, including the Candy Abshier Wildlife Management Area on Smith Point. It is an important stop-over site for spring and fall migrant birds (TPWD Endangered Resources Annual Status Report 1991).

EVALUATION

One of the most important factors leading to species decline is loss of habitat. Species protection rests first and foremost on maintaining habitat. However, even the most thriving wetland or estuary cannot protect a species threatened by overfishing or hunting.

Considering the difficulty of monitoring the thousands of hunters and fishermen, it is ironic that enforcement in this area appears to be among the more effective enforcement programs we examined. Perhaps some of this success is attributable to the fact that TPWD and many sportsmen's clubs constantly reiterate the message that conservation is a necessary basis for continued hunting or fishing.

In other areas, programs limiting access to commercial fisheries have proven acceptable and effective in improving incomes of individual fishermen. Perhaps a market in fishing rights, based, like air pollution rights, in part on present use would be both politically and environmentally expedient.

A decline in abundance of colonial waterbirds, overwintering shorebirds and all types of migrating birds is probably due to habitat loss. Greater efforts are needed to create or restore habitat. Nesting areas need to be posted to prevent human intrusion into breeding, roosting and feeding areas. Assistance of local groups, such as that provided by the Houston Audubon Society's leasing program and proposed new posting and education program, is essential in this goal because of

the widely dispersed nature of habitat.

Congressional reauthorization of the Endangered Species Act will either provide a continuing basis for protection of species and their habitat or will sound the death knell for America's strongest environmental program. Texas' own endangered species program will be similarly endangered if the federal program falls.

SUMMARY EVALUATION: SPECIES

1. Problem. Decline in aquatic species population is primarily due to both overharvesting and destruction of habitat. Decline in wildlife (primarily bird species) is due to loss of habitat including wetlands, wooded uplands, and isolated barrier islands and reefs for shore birds. Activities that alter the salinity of the water in these habitats destroy vital feeding grounds.

2. Authority. Aquatic life and wildlife are regulated by TPWD under the Parks and Wildlife Code including the taking of aquatic resources for both commercial and sport reasons. Regulations are enforced through a combination of administrative and criminal penalties. Methods, quantities, sizes, and season of catch are all regulated.

3. Capacity. Although improved in recent years, capacity is still only fair due to poor enforcement of criminal penalties and too few field officers with too many diverse responsibilities. Success in endangered species enforcement programs are being counteracted by continued loss of habitat.

4. Policy. Unlike enforcement, bay programs that work to halt species depletion are largely cooperative efforts between TPWD and USFWS. This is particularly true for protecting endangered species. State program supplemented by federal programs. In the past, these programs have been species-specific, but are beginning to use an ecosystem approach.

5. Technical and environmental results. Conservation efforts generally successful, but continued loss of habitat and overharvesting of certain aquatic life. Enforcement of species taking via criminal penalties low.

6. Barriers and problems. Control over enforcement is overly decentralized, results in too few convictions, and also results in forfeited revenues that should be channeled back into conservation programs. Protection of the enormous diversity of species in the bay system is a daunting task. Habitat creation and replenishment programs aimed at certain species only are limited in their success.

7. Recommendations. Authorities should consider addressing the overharvesting problem through programs which either limit licenses, or which allow fishing rights to be traded in the same way that based air pollution rights are traded. With regard to enforcement, legislation should be considered that prohibits deferred adjudication on fishing and hunting violations. This should allow TPWD officials to present a more compelling case, and result in more convictions. Revenues from criminal penalties should be channeled back into conservation programs. Conservation programs should focus on the preservation of species as they contribute to the diversity of the bay's ecosystem.